

## Claims

1. Interface link layer device (1) connected to a first data bus (2) and via a transmission path (3) to at least one other interface link layer device (4) that is connected to a second data bus (5), **characterized by**
- uplink means to accept a data packet from the first data bus (2) that has a predetermined destination or that has a channel number of a data channel that leads from the first data bus (2) to one of said the second data busses (5) and to transmit it via said transmission path (3) to said other interface link layer device (4) serving said predetermined destination; and
  - downlink means to output data packets received via said transmission path (3) from one of said at least one other interface link layer devices (4) to a predetermined destination on the first data bus (2).
2. Interface link layer device according to claim 1, **characterized in that** said uplink means comprise a first register (12) that reflects destination identifiers which will be accepted.
3. Interface link layer device according to claim 2, **characterized in that** said destination identifier is a bus identifier of said respective second data bus (5) and said first register (12) comprises a bus enable register identifying said respective second data bus (5) that is serving said predetermined destinations.
- a 4. Interface link layer device according to claim 2 ~~or 3~~, **characterized in that** said destination identifier is a node identifier and said first register comprises a node enable register identifying at least one predetermined destination.
- a 5. Interface link layer device according to <sup>Claim 1</sup> ~~anyone of the preceding claims~~, **characterized in that** it sets-up a direct connection to each one of said at least one other interface link layer devices (4) and said uplink means comprise a fourth register (17) that includes a destination identifier of each one of said at least one other interface link layer devices (4).
6. Interface link layer device according to claim 5, **characterized in that** it is able to route data packets to another interface link layer device (4) it has a direct connection with.

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10 7. Interface link layer device according to claim 5 ~~or 6~~, **characterized in that** said uplink means comprise a third register (14) that stores an available bandwidth of a connection to another interface link layer device (4) it has a direct connection with.

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a 8. Interface link layer device according to <sup>claim 1</sup> ~~anyone of the preceding claims~~, **characterized in that** said uplink means comprise a second register (15) that reflects all respective channel numbers of a data channels which will be accepted that carry data packets from one source node of the first data bus (2) to another destination node of one of the second data busses (5) via said interface link layer device (1).

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9. Interface link layer device according to claim 8, **characterized in that** said second register (15) stores an identifier of said source node and/or said destination node.

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a 10. Interface link layer device according to claim 8 ~~or 9~~, **characterized in that** said second register stores the speed of said data channel.

20 a 11. Interface link layer device according to claim 8, ~~9 or 10~~, **characterized in that** said second register stores the payload of said data channel.

a 12. Interface link layer device according to <sup>claim 1</sup> ~~anyone of the preceding claims~~, **characterized by** an acknowledge code generator (18) that generates an acknowledgement to be send to the originator of a data packet accepted from the data bus (2) it is connected to and transmitted via said transmission path (3) to a predetermined destination different to itself.

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13. Interface link layer device according to claim 12, **characterized in that** said acknowledgement indicates a pending action in case a data packet is forwarded to another predetermined destination.

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a 14. Interface link layer device according to claim 12 ~~or 13~~, **characterized in that** said acknowledgement indicates a completed action in case a data packet was forwarded to another predetermined destination and said other destination returns a response packet without any errors.

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15. Interface link layer device according to claim 12, ~~13 or 14~~, **characterized in that** said acknowledgement indicates an error in case of a data reception error.

16. Interface link layer device according to <sup>claim 1</sup> ~~anyone of the preceding claims~~, **characterized by** a response packet generator (19) that generates a response to be send via the transmission path (3) to the destination of an acknowledge code received via said first data bus (2).

17. Interface link layer device according to claim 16, **characterized in that** said response indicates a completed action in case a completed action acknowledge code is received.

18. Interface link layer device according to claim 16 ~~or 17~~, **characterized in that** no response is send in case a pending action acknowledge code is received.

19. Interface link layer device according to claim 16, ~~17 or 18~~, **characterized in that** said response indicates a busy destination in case a busy acknowledge code is received.

20. Interface link layer device according to <sup>claim 16</sup> ~~anyone of claims 16 to 19~~, **characterized in that** said response indicates a data error in case a data error acknowledge code is received.

21. Interface link layer device according to <sup>claim 16</sup> ~~anyone of claims 16 to 20~~, **characterized in that** said response indicates a type error in case a type error acknowledge code is received.

22. Interface link layer device according to <sup>claim 16</sup> ~~anyone of claims 16 to 21~~, **characterized in that** said response packet generator (19) monitors the request packets output to the first data bus (2) to generate the response packet.

23. Interface link layer device according to <sup>claim 1</sup> ~~anyone of the preceding claims~~, **characterized in that** said downlink means comprises a channel number assignment unit (21) that assigns an appropriate channel number to a data packet received via said transmission path (3) that gets forwarded on the first

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1 data bus (2) on a channel different to the channel the data packet has left its source on the respective second data bus (5).

a 24. Interface link layer device according to <sup>claim 1</sup> ~~anyone of the preceding claims~~,  
5 **characterized in that** said uplink means comprises a packetizer (13) that is able to repack data packets received from the first data bus (2) into a format of the transmission path (3) that is different to the format of the first data bus (2).

a 10 25. Interface link layer device according to <sup>claim 1</sup> ~~anyone of the preceding claims~~,  
**characterized in that** said downlink means comprises a packet separator (20) that is able to repack data packets received from the transmission path (3) into a format of the first data bus (2) that is different to the format of the transmission path (3).

15 a 26. Interface link layer device according to <sup>claim 1</sup> ~~anyone of the preceding claims~~,  
**characterized in that** said transmission via said transmission path (3) from or to said other interface link layer device (4, 8) is performed directly or via one or more other link layer devices (4, 8).

20 a 27. Interface link layer device according to <sup>claim 1</sup> ~~anyone of the preceding claims~~,  
**characterized by** a controllable switch (16a, 16b) to route predetermined data packets received on a data channel of the transmission path (3) via another data channel of the transmission path (3) to another interface link layer device (4, 8).

25 a 28. Interface link layer device according to <sup>claim 1</sup> ~~anyone of the preceding claims~~,  
**characterized in that** it forwards data packets from said first data bus (2) with a destination of the interface link layer device (1) via said transmission path (3) to another interface link layer device (4; 4A, 4B) which is connected to one of said second data busses (5; 5A, 5B) serving only one further destination.

30 a 29. Interface link layer device according to <sup>claim 1</sup> ~~anyone of the preceding claims~~,  
35 **characterized in that** it forwards all data packets from said first data bus (2) serving only one predetermined destination via said transmission path (3) to another interface link layer device (4; 4A, 4B) which is connected to one of said

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30. Interface link layer device according to ~~anyone of the preceding claims,~~  
**characterized in that** it translates a destination of a data packet directed to  
 an interface link layer device into a predetermined other destination which is  
 the only further destination on the respective data bus connected to said other  
 destination and/or it translates a predetermined source of a data packet di-  
 rected to a predetermined destination into a source of an interface link layer  
 device.

31. Interface link layer device according to <sup>Claim 1</sup> ~~anyone of the preceding claims~~,  
**characterized in that** said data bus is an IEEE 1394 bus.

a 33. Interface link layer device according to <sup>claim 1</sup> ~~anyone of the preceding claims~~,  
characterized in that said transmission path (3) is build by a cable, in par-  
20 ticular a coaxial cable, a light guide and/or a radio connection.

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